Interim Progress Report submitted to
NOAA's Human Dimensions of Global Change Research (HDGCR) Program

Project Title: Impacts of Water Resource Management Choices in Ceará, Brazil: Roles of Streamflow Forecasts, Rainfall Forecasts and Participatory Decision Making

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Time period covered
April 1, 2004 – March 31, 2007 ***[note that funding was not received until September 2004]***

I. Preliminary Materials

A. Project Abstract (Text Limit: one page)

We propose to analyze the impacts of shifts in water resource management in Ceará, NE Brazil, emphasizing the variation in benefits and costs across the suite of stakeholders who are affected, and focusing on the potential roles for climate information and for participatory decision making. Specifically, we propose to study impacts in the Jaguaribe and Metropolitano basins, the largest and most populated water basins in this state and areas prone to recurrent, multi-year droughts. These basins contain a wide range of stakeholder types who are affected differently by policies. Understanding how proposed shifts in water allocation and reservoir system operation may affect these users over a spectrum of scenarios is critical for formulating equitable and efficient policy. We will work jointly with relevant local policy makers to develop and test decision support tools.

Three specific types of recently considered policies will receive the bulk of analytical attention:
Policy 1) basing reservoir releases upon streamflow forecasts based upon climate information;
Policy 2) providing improved seasonal-to-interannual precipitation forecasts to all water users;
Policy 3) changing the role of participatory water allocation seminars in the release decisions.

B. Objective of Research Project (Text Limit: one paragraph)

The objectives of our research our to answer the following guiding questions:

- What are gains from basing releases upon seasonal-to-interannual streamflow forecasts, how are gains distributed across stakeholders, and who if anyone faces increased risk?

- How do historical uncertainty and current climate forecasts affect production decisions?
- What roles do stakeholders play in release choices through water allocation seminars and how could agency scenarios and rainfall forecasts affect consensus and actors' choices?
- For agencies to evaluate water management options, e.g. use of forecasts or water rights, which form and content of scenario simulations best support actual decision processes?

C. Approach (including methodological framework, models used, theory tested) (Text Limit: one page)

Using ethnographic and survey methods, analysis of existing data sets, quantitative inference and modeling, and finally, envisioning tools, we propose to address the above questions. To date, we have focused on survey development (design and pilot testing) and database analysis (gathering, organization and gross descriptive statistics).

D. Description of any matching funds used for this project. (Text Limit: one paragraph)

Columbia University is providing matching funds in the form of salary support for Alexander Pfaff and Upmanu Lall. FUNCEME (Ceará meteorology and hydrology agency) has agreed to provide communication, capital equipment or expendable supplies as in-kind support. Funds for the computer programming, model development, office support in Ceará, and travel support will be provided by the IRI, which is actively involved in climate research in its partnership with FUNCEME. IRI is also providing funding for a full time postdoctoral researcher to oversee in-country fieldwork and survey administration. Further, the University of Miami's Center for Ecosystem Science and Policy has pledged $30,000 to be used toward dissemination of our findings in Ceará.

II. Interactions

A. Description of interactions with decision-makers who were either impacted or consulted as part of the study; include a list of the decision makers and the nature of the interaction; be explicit about collaborating local institutions. (Text Limit: half page)

As funds for the study were acquired relevantly recently (September 2004) we have just initiated active collaboration with decision makers. This collaboration has taken the form of extensive discussions related to the draft survey instrument, gathering of agricultural/water database information. The primary agencies involved include FUNCEME and COGEHR (Local water management organization) DNOCS (Federal Agency in charge of infrastructure and operations). An additional joint activity is the co-editing of a book between IRI and FUNCEME that addresses the climate, hydrological and sociological dimensions of drought in region. FUNCEME is also hoping to send one of their top engineers to IRI via a Fulbright Scholarship to continue working on a reservoir simulation model that eventually will part of our proposed DSS.

B. Description of interactions with climate forecasting community (i.e., coordination with NOAA climate forecasting divisions, the International Research Institute for climate prediction (IRI), regional or local climate forecasting entities, etc.) (Text Limit: half page)

Our project builds upon the forecast advances made at IRI in dynamic downscaling and statistical streamflow forecasts. As this is ongoing research at the IRI, interaction is constant.

FUNCEME is the local forecasting agency and is an active collaborator in development and testing of the survey instrument to assure it is meeting their needs. COGEHR has provided an extensive database for agricultural uses of water. As an initial step in survey development we interviewed numerous Ceará public agencies about their informational gaps that affect planning for climate variability and have tried to address many of these gaps in our survey instrument.

C. Coordination with other projects of the NOAA Climate and Societal Interactions Division (i.e., other HDGCR, Research Applications, or Regional Integrated Sciences and Assessments projects) (Text Limit: half page)

Not applicable

III. Accomplishments

[note that these are based on only two months of project time as funds were received in September 2004]

Extensive interviews with Ceará agencies on informational needs.
Design and pilot application of survey instrument.
Organization and initial analysis of COGEHR database to establish typology of users for survey sample selection.
We have initiated steps to hire a post-doc now that the funds are relatively secure.